

For each of the following, determine the following for each  $L$ : (a) image, (b) kernel, (c) eigenvalues and associated eigenvectors, and (d) a geometric description of the transformation.

1.  $L = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$

2.  $L = \begin{pmatrix} 5 & 0 \\ 0 & -3 \end{pmatrix}$

3.  $L = \begin{pmatrix} 1 & 4 \\ -1 & -2 \end{pmatrix}$

4.  $L = \begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$

5.  $L = \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$

6.  $L = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$